The Establishment of IIT Madras

German Cold War Development Assistance and Engineering Education in India

Roland Wittje[1]

Abstract
The Indian Institute of Technology (IIT) Madras was established between 1959 and 1974 with assistance of the Federal Republic of Germany, which was the largest West German enterprise in the field of technical education abroad. The support consisted of German experts for teaching and in setting up laboratories and workshops. In this article, I argue that the engagement of the Federal Republic at IIT Madras must be understood primarily as a political project. The Federal Republic saw itself in direct competition with the Soviet Union, but also with the USA and the UK, which in turn supported the establishment of the IITs in Bombay, Kanpur and Delhi. While West Germany's engagement had initially been motivated by influencing India's position on divided post-war Germany, this changed towards the end of the 1960s to the vested interest of German policymakers in long-term scientific and technical cooperation. The German assistance was reoriented, from workshop-based engineering education to setting up a technological research university. Planning and policy were guided by political premises, to which the educational and scientific aspects were subordinate, and German staff was controlled and restricted in its scientific freedom. The German faculty saw themselves confronted with implementing a project which had been politically predefined as a successful Indo-German collaboration, by establishing meaningful research and engineering training. As a case study, the article contributes to the important history of aid in technical educational as part of West- as well as East German development aid during the Cold War, which so far has received little if any attention among historians.

Überblick
Von 1959 bis 1974 wurde das Indian Institute of Technology (IIT) Madras mit westdeutscher Hilfe als größte Unternehmung der Bundesrepublik im Bereich technischer Bildung im Ausland aufgebaut. Die Unterstützung bestand aus Experten zur Lehre und im Aufbau von Laboren und Werkstätten. In diesem

1 I would like to thank Arvind Sivaramakrishnan, Kumaran Sathasivam, Thomas Tharu, Marcus Popplow, Jahnavi Phalkey, and two anonymous reviewers for valuable comments and corrections.

Beitrag lege ich dar, warum das Engagement der Bundesrepublik Deutschland am IIT Madras vornehmlich als politisches Projekt verstanden werde muss. Die Bundesrepublik sah sich in direkter Konkurrenz zur Sowjetunion, aber auch zur USA und Großbritannien, die ihrerseits die Gründungen der IITs in Bombay, Kanpur und Delhi unterstützten. Während in den Anfangsjahren Indiens Haltung zur Frage der deutschen Teilung das Hauptmotiv für das westdeutsche Engagement bildete, rückte gegen Ende der 1960er Jahre das Interesse an einer langfristigen wissenschaftlich-technischen Kooperation in den Vordergrund. Die deutsche Planung wurde neu orientiert, von einer ursprünglichen Technischen Lehranstalt mit praktischer Ausbildung hin zu einer wissenschaftlich ausgerichteten Technischen Hochschule. Planung und Ausführung geschahen hauptsächlich nach politischen Prämissen, denen die pädagogischen und wissenschaftlichen Aspekte untergeordnet waren. So wurde der deutsche Lehrstab in seiner wissenschaftlichen Freiheit eingeschränkt und kontrolliert. Die deutschen Lehrkräfte sahen sich damit konfrontiert, ein von der Politik a priori als erfolgreich definiertes Projekt deutsch-indischer Zusammenarbeit vor Ort in sinnvolle Forschung und Ingenieurausbildung umzusetzen. Der Artikel leistet damit als Fallstudie in seiner Analyse einen Beitrag zur noch kaum erforschten Geschichte der technischen Bildungshilfe als zentralem Teil der west- als auch ostdeutschen Entwicklungshilfe im Kalten Krieg.

Introduction: IIT Madras as a political project

The Indian Institute of Technology (IIT) Madras was set up with the support of the Federal Republic of Germany between 1959 and 1974. Today IIT Madras is one of the premier institutions of scientific and technical education in India. It opened as the third of a current total of 23 Indian institutes of technology, a group of elite technical universities which have been declared Institutions of National Importance in 1961. Their brand product, the IIT graduate (or 'IITian') has gained value on the international market and enjoys high reputation in higher education in science and engineering, especially in the American IT industry.[2] IIT Madras became the largest project undertaken by the Federal Republic of Germany to establish a technical university abroad. Experts in student teaching were granted support, and laboratories, workshops and other facilities installed, as well as scholarships funded for Indian scientists and technicians to train in Germany.

This paper argues that the engagement of West Germany at IIT Madras has to be understood primarily as a political project of the Cold War. It discusses the implications of this political governance of West German aid on the German faculty members who implemented this politically guided policy

2 Sandipan Deb, The IITians. The Story of a Remarkable Indian Institution and How Its Alumni Are Reshaping the World (New Delhi 2004); Ajantha Subramanian, The Caste of Merit. Engineering Education in India (Cambridge, Mass. 2019), 1.

in academic practice at IIT Madras. The governance of the project, until 1961 directly answerable to the West German Foreign Office (*Auswärtiges Amt*), followed political guidelines to which educational and scientific aspects were subordinate. German professors at IIT Madras were tightly controlled by administrators and the consulate of the Federal Republic of Germany in Madras.

When Indian Prime Minister Jawaharlal Nehru came to West Germany in 1956, German Chancellor Konrad Adenauer extended the offer to set up an institute of technology in India. The main concern of the Federal Republic at the time was India's position on divided post-war Germany. After the first Indo-German agreement on the establishment of IIT Madras expired in 1963, the collaboration fell into crisis since the completion of the project was nowhere in sight, prompting the West German government to increase its support significantly and restructure the project substantially. In the second agreement, signed in 1966, the focus of this German assistance shifted from practical workshop training to the establishment of technology research laboratories. Political objectives and control issues generated dissonance between the administrators in West Germany and the German staff on the ground. I discuss this specifically by drawing on the experiences of two members of the staff: Edith Butenuth, who set up an electron microscopy laboratory, and Hermann Heitmann, who launched a questionnaire survey that was aborted by Indian and German officials.

Although the Federal Republic of Germany was a close ally in the Western bloc led by the United States, its policy on development aid had a life and logic of its own. It is important to consider the historical specificity of Indo-German relations in the colonial and post-colonial world. Germany could look back on a longue durée Indo-German intellectual relationship from its strong academic standing on Indology, its record of hosting Indian students in Germany, and operating German businesses in India.[3] German engineering and technical education enjoyed particularly high status in India. West German assistance to IIT Madras needs to be understood as part of an extensive engagement in technical education by both West and East Germany in India as well as in other countries that came to be seen as the developing world during the Cold War. Although assistance in technical education was an important component of German development aid during the Cold War, it has not featured prominently in the literature so far.[4] This paper, therefore, aims to contribute to the

3 Kris Manjapra, Age of Entanglement. German and Indian Intellectuals Across Empire (Cambridge, Mass. 2013); Christina Lubinski, "Business beyond Empire. German Multinationals in Pre- and Post-Independence India (1890s–1960s)", Journal of South Asian Studies 41, No. 3 (2018), 621–641.

4 Stuart W. Leslie and Robert Kargon are exceptions (Stuart W. Leslie and Robert Kargon, "Translating American Models of the Technical University to India and South Korea", in Sciences et Développement, ed. M. Barrere (Paris 1996), 153–166 and Leslie and Kargon, "Exporting MIT. Science, Technology, and Nation-Building in India and Iran", Osiris 21 (2006), 110–130), who examined the export of MIT as a model for engineering education to

existing literature in two ways: First, to enrich the histories of development by including technical education as German development aid, and second, to shift the debate away from the American focus which has dominated the history of development and development policy thus far.[5]

IIT Madras was the third of five Indian Institutes of Technology that were inaugurated between 1951 and 1962; four of them were set up in collaboration with another country. IIT Kharagpur was set up with the assistance of the United Nations, IIT Bombay received assistance from the Soviet Union, IIT Kanpur from the United States, and IIT Delhi from the United Kingdom.[6] For the nascent Indian state, the establishment of IITs was a political project of modernization and ongoing nation building. From the late 19th century onwards, there were continual disputes between the Indian elites and political leaders and the British colonial administrators about technical education in India.[7] In the 1930s, the question of development moved center stage in the political and economic debate, both for the British who used an apparent demand for 'improvement' as justification for their colonial rule over subjects whom they identified as 'backwards', and for the Indian National Congress, who accused the British Raj of having impoverished India under its rule and prevented its technological and industrial development.[8]

As in other countries that had gained independence at the end of WWII, in India the political leaders also believed that the road to development led through heavy industrialization and techno-scientific development. Both the New Deal in the USA and science-based centrally planned industrialization in the USSR served as models for large-scale techno-scientific development for India. These were significantly different notions of development from those imposed by Britain and other colonizing powers.[9] Large projects like radar development and the Manhattan Project had a crucial impact on the outcome of World War II and the political landscape in its aftermath. Already in 1945,

Asian countries. Regarding Germany, the only contributions on the topic seem to have been published by the Gesellschaft für Technische Zusammenarbeit (GTZ), since 2011 part of the Gesellschaft für Internationale Zusammenarbeit (GIZ), which coordinated the assistance; see Sabine Preuss (ed.), "Ohne Toleranz funktioniert nichts". Indisch-deutsche technische Zusammenarbeit. Berufsbildung, Hochschule, ländliche Entwicklung (1958–2010): Reportagen, Interviews, Porträts (Frankfurt a.M. 2013) and Peter Esderts (ed.), Technische Hochschule Madras. Zwei Fallstudien über Verlauf und Ergebnisse eines Bildungsprojektes im Rahmen der Deutschen Technischen Zusammenarbeit mit Indien (Eschborn 1978).

5 See, for example, Nils Gilman, Mandarins of the Future. Modernization Theory in Cold War America (Baltimore, 2003).

6 Kim P. Sebaly, The Assistance of Four Nations in the Establishment of the Indian Institutes of Technology 1945–1970. PhD dissertation (University of Michigan, 1972).

7 Ross Bassett, The Technological Indian (Cambridge, Mass. 2016); Subramanian, The Caste of Merit, 27–57.

8 Benjamin Zachariah, Developing India. An Intellectual and Social History (New Delhi 2005).

9 See ibid. and Gilman, Mandarins of the Future, 30–41.

Vannevar Bush, director of the US Office of Scientific Research and Development, advanced a forceful argument in favor of continued investment in basic scientific research for economic as well as social development, in his report *Science – The Endless Frontier*, fueling the belief in science and technology as an almost unlimited problem-solving capacity.[10] In this vision of development, India and other countries were expected to industrialize almost inevitably, if only the government invested sufficiently in techno-scientific research and education.

Indian national leaders were anything but uncritical of European or American-style modernization through large-scale industrialization. Mohandas Gandhi insisted that Indian development had to be based on its villages and its small-scale cottage industries, leading to an intense debate about Gandhian ideas of development in the Indian National Congress.[11] After Indian independence in 1947 and Gandhi's assassination shortly thereafter, Gandhian ideas of development took a back seat in favor of large-scale industrialization. Jawaharlal Nehru, the prime minister of India for the first 17 years after independence, remained critical of 'Western' modernization and industrialization even as he understood science as a crucial resource in his project to transform India into a modern nation state. Nehru considered science and technology not only as tools to industrialize and develop India economically; he also elaborated on the concept of scientific temper as a means to unite, renew, and develop India spiritually. He thought scientific temper should replace superstition and advance a secular techno-scientific rationality in a society deeply defined and divided along religious and community lines.[12] In Nehru's vision of modernizing India, the Indian institutes of technology played a key role, as they were meant to make India self-sufficient with scientifically trained engineers. But they were also conceived as engines of social transformation and as promoters of equality, transcending caste and religious differences.

Independent India became a key battleground for Cold War development policy since it was the world's most populous democratic nation. India, alongside Egypt, Indonesia and Yugoslavia, emerged as a leader of the non-alignment movement forged by Nehru, who actively sought a third way away from capitalism and state communism. India's carefully crafted closeness as well as distance from both the Western bloc and the Soviet Union made it possible for India to maintain economic ties with both the East German Democratic Republic (GDR) and the West German Federal Republic.[13]

10 Vannevar Bush, Science – The Endless Frontier. A Report to the President on a Program for Postwar Scientific Research (Washington, D.C. 1945).

11 Zachariah, Developing India, 156–210.

12 See Gyan Prakash, Another Reason. Science and the Imagination of Modern India (Princeton, NJ. 1999), 210–214, and David Arnold, "Nehruvian Science and Postcolonial India", Isis 104, No. 2 (2013), 360–370.

13 Benjamin Zachariah, Nehru (London 2004), 198–223.

The history of the Indian institutes of technology is usually told as an Indo-American story based on the importation of an MIT-like model of techno-scientific education into India.[14] However, for the Indo-German collaboration at IIT Madras, MIT never had been invoked as its model, and its story is distinctly different. In assisting the IIT Madras, the Federal Republic of Germany came into direct competition with the Soviet Union, which supported IIT Bombay, as well as with the USA, which supported IIT Kanpur. While West Germany was a member of the hegemonic Western bloc led by the USA, it followed its very own development policy (*Entwicklungshilfepolitik*).[15] The outcome of World War II left Germany divided into the Federal Republic of Germany, which was formed in May 1949, and the GDR, which was subsequently formed in October 1949. After the Soviet Union had declared the sovereignty of the GDR in March 1954, the Federal Republic obtained sovereignty in May 1955 and joined the North Atlantic Treaty Organization quickly thereafter.

The young Federal Republic regarded it as vital to its existence to deny the GDR any right to represent Germany as a whole. In intending to establish a strong presence in India, the Federal Republic of Germany wanted to eclipse any importance that could have potentially been gained by the GDR. In 1955, the Federal Republic of Germany adopted the Hallstein doctrine, which regarded recognition of the GDR as a sovereign nation by any country as an unfriendly act. The Federal Republic considered its support of India, which under Nehru had become a leader of the non-alignment movement, as vital to enforcing this doctrine, whereupon India received a large share of West German development aid. Although the GDR maintained extensive trade relations with India, the Hallstein doctrine succeeded insofar as India did not establish formal diplomatic relations with the GDR before 1972, when the Hallstein doctrine was abandoned and the relationship between the two German states started to normalize.[16]

My narrative starts with the opening of IIT Madras in 1959 and ends in 1974, when the German faculty and technicians handed over laboratories and workshops to their Indian partners and declared the process of setting up IIT Madras as completed. This paper is largely based on sources from German archives, including the Political Archive of the Federal Foreign Office and the German Federal Archives, and reflects the history of the Indo-German collaboration mainly from the perspective of German government representatives and faculty. I have also made use of available sources at IIT Madras, such

14 See Leslie and Kargon, "Translating American Models" and "Exporting MIT", and Bassett, The Technological Indian.

15 Corinna Unger, "Industrialization vs. Agrarian Reform. West German Modernization Policies in India in the 1950s and 1960s", Journal of Modern European History 8, No. 1 (2010), 47–65; Amit Das Gupta, Handel, Hilfe, Hallstein-Doktrin. Die bundesdeutsche Südasienpolitik unter Adenauer und Erhard 1949 bis 1966 (Husum 2004).

16 Johannes H. Voigt, Die Indienpolitik der DDR. Von den Anfängen bis zur Anerkennung (1952–1972) (Cologne and Weimar 2008).

as annual reports and the extensive photo collection of the Heritage Centre, while the Archive of IIT Madras is currently being set up.[17]

My narrative is divided into three phases defined by three Indo-German agreements: The first phase lasted from the inauguration in 1959 until 1966 when the second agreement was signed. I have elsewhere written about the diplomatic history that led to the West German offer in 1956 to establish an institute of engineering education in India, and about the German planning until its opening.[18] The first agreement, signed in 1958, expired in 1963. The following three years mark a period of crisis when the West German government realized that the original plan to set up IIT Madras in just four years could not be realized in practice. The West German Foreign Office, which was in charge but had little if any experience in establishing institutions of technical education in foreign countries, had clearly underestimated the challenges of setting up IIT Madras.

The West German administrators initially wanted to establish a non-academic practically oriented engineering school (a *Technische Lehranstalt* in German), while their Indian partners had insisted from the beginning that IIT Madras should be a technological research university (a *Technische Hochschule*). In Germany, a *Technische Lehranstalt* was a polytechnical school that did not enjoy academic status and liberties, and its students did not require the *Abitur*, the German secondary school degree essential to enrolment at a German university or *Technische Hochschule*. The German policymakers finally came to terms with the fact that they had to abandon their original plan to set up a practically oriented non-academic engineering school. IIT Madras had to be developed into a research university if the Federal Republic of Germany was not to lose against the competition by the Soviet Union at IIT Bombay, the USA at IIT Kanpur, and the UK at IIT Delhi.

The policymakers in the West German government could not allow IIT Madras to fail; for political reasons IIT Madras, which they identified as 'the German IIT', had to be a successful project. The Hallstein doctrine had defined the objectives of West German foreign policy towards India negatively: to convince India not to recognize the sovereignty of the GDR.[19] Its reorientation after 1966 made room for a long-term perspective on Indo-German techno-scientific collaboration. In the second phase from 1966 to 1971, the Federal Republic of Germany committed itself to developing IIT Madras into a technological research university, doubling its staff from 20, as specified in the first agreement, to 40 German faculty members and technicians, and setting up a large number of research laboratories on campus. The planning and

17 See https://archive.iitm.ac.in/collections.

18 Roland Wittje, "Engineering Education in Cold War Diplomacy. India, Germany and the Establishment of IIT Madras", Berichte zur Wissenschaftsgeschichte 43, No. 4 (2020), forthcoming.

19 Das Gupta, Handel, Hilfe, Hallstein-Doktrin, 18.

execution of the first phase had been directed by the Federal Office; henceforth the governance was taken over by the Madras Committee, a consortium of four West German technological research universities. The third agreement, covering the period from 1971 to 1974, marked the third stage with the consolidation of the project, the establishment of the Computer Centre, and the departure of the West German experts. The German mentorship of IIT Madras was gradually transformed into a cooperation through scientific collaboration and student exchange which continues today.

1959–1966: The first Indo-German agreement

The decision by the Federal Republic to support setting up an Indian institute of technology was motivated, as mentioned earlier, by the ambition to gain political influence in Delhi in order to prevent Nehru from establishing diplomatic relations with the GDR. Although German Chancellor Adenauer formally extended the offer to Nehru during his state visit in July 1956, Indian diplomats had made it explicit prior to the meeting that such an offer would be welcomed.[20] German representatives figured that assistance with technical education would be less expensive than other forms of development aid and was a safe strategy to gain political capital in India.[21] The Soviet Union had already advanced its offer to assist in the establishment of IIT Bombay, and the West German government saw itself in a competition that it was not willing to lose.

In October 1956, the Rucker mission, named after its leader August Rucker, professor of architecture at the Munich *Technische Hochschule* and minister of education of the Bavarian State, went to India for four weeks to plan the establishment of 'the German IIT'.[22] The German planners propagating a model along the lines of a *Technische Lehranstalt* and practical engineering education, focused on workshop training (see Cover Image).[23] The first Indo-German agreement, signed in Bonn on 5 August 1958, listed nine different types of workshops, including a carpentry shop, a foundry, a welding shop, a fitting shop, a machine tool shop, a blacksmith's shop, an electrical workshop, a machine workshop, and a precision mechanics workshop. No specifications were made for teaching and research laboratories.[24]

IIT Madras was ceremoniously inaugurated on 31 July 1959 by Humayun Kabir, India's minister of scientific research and cultural affairs, almost three

20 Ref. Otto Heipertz, "Vermerk Deutsche technische Hilfe für Indien", 27 June 1956 (Politisches Archiv des Auswärtigen Amts, Berlin (henceforth PA AA), B 58/35). See also Wittje "Engineering Education in Cold War Diplomacy".

21 Ibid.; Ref. Otto Heipertz, "Aufzeichnung Deutsche-Indische Technische Lehranstalt", 6 December 1956 (PA AA, B 58/35).

22 "Programme of the German Technical Mission in India 23rd October 1956 to 24th Nov. '56", (PA AA, AV Neues Amt 3.661).

23 Wittje "Engineering Education in Cold War Diplomacy".

24 Esderts, Technische Hochschule Madras, 204.

Fig. 1: Minister of Economic Cooperation and Development of the Federal Republic of Germany, Walter Scheel (center), visibly enjoying woodwork in the carpentry workshop during his visit to IIT Madras on 4 December 1963. The man in the white suit on the right is Professor Bibhutibhushan Sengupto, the first director of IIT Madras. Photographed by Cadambi Gourishankar (Photo: Heritage Centre, IIT Madras).

years after the Rucker mission had come to India. The German chargé d'affaires, Wilhelm G. von Heyden, delivered the inaugural address on behalf of the embassy of the Federal Republic of Germany. "This institution", Heyden announced, "will thus represent a great measure of material and spiritual development of India".[25] It was important for West German diplomats to show their presence. Not long ago Otto Grotewohl, prime minister of the GDR, had visited India and Nehru, in January 1959, to extend trade relations with the hope of establishing formal diplomatic ties.[26] The construction of buildings on campus was still in its initial phase and the institute was using teaching premises and hostels at neighboring colleges and institutes.[27]

From its inception, IIT Madras was an arena for celebrating successful Indo-German diplomatic and techno-scientific relations. Theodor Heuss, who had attended Nehru's state visit in 1956 as the first president of the Federal Republic, visited IIT Madras on 17 November 1960.[28] West Germany's second president, Heinrich Lübke, came to IIT Madras during his state visit to India on 3 December 1962 and laid the foundation stone of the Institute.[29] Walter Scheel

25 "Address by Mr. W. G. von Heyden ....", 31 July 1959 (PA AA, AV Neues Amt 3.666).
26 See Voigt, Die Indienpolitik der DDR.
27 Indian Institute of Technology Madras Magazine 1 (Madras 1960), 6.
28 Annual Report 1960–1961. Indian Institute of Technology Madras (Madras 1961), 11. By the time of his visit, Heuss's term as president of the Federal Republic of Germany had ended.
29 Annual Report 1962–1963. Indian Institute of Technology Madras (Madras 1963), 1.

as the first federal minister of economic cooperation and development visited IIT Madras on 4 December 1963 (see Fig. 1).[30] President Lübke's visit to IIT Madras featured in Heinrich von Tiedemann's newsreel *Der Staatsbesuch in Indien – Dokument einer Freundschaft und Partnerschaft* (The State Visit in India – Document of a Friendship and Partnership).[31] Tiedemann's newsreel celebrated IIT Madras as a successful example of Indo-German techno-scientific collaboration. The film went on to suggest a link between IIT Madras and the Atomic Energy establishment in Trombay, which Lübke visited on the same trip.

The reality of Indo-German collaboration at IIT Madras looked less glamorous, however. By the time the first agreement had terminated in August 1963, only eight of the 20 German members specified in the Indo-German agreement of 1958 had joined the faculty as specialists; these were matched by 140 Indian teachers, most of them associate lecturers. The German faculty at IIT Madras in 1963 included Professor of Physics Werner Koch, Professor of Engineering Drawing Wolfgang Scheer, Professor of German Nikolaus Klein, Professor of Applied Mechanics Kurt Haug, Professor of Civil Engineering Gerhard Rouvé, Professor of Mechanical Engineering Günter Stahl, Associate Professor of Electrical Engineering Siegfried Seinecke, and Professor of Mechanical Engineering Herbert Heitland.[32] The German involvement was relatively strong in mechanical engineering, which was also the Institute's largest department, whereas there was no German presence at all in the Departments of Chemistry, Chemical Engineering and Metallurgy in 1963.

Considering such numbers, German teaching methods—however understood—could hardly have been implemented. Many German engineers had come to India during the turmoil of the immediate post-war years, but it was becoming increasingly difficult to recruit qualified engineering faculty for IIT Madras during the West German *Wirtschaftswunder*, when engineers were in high demand in the booming Federal Republic of Germany. Potential candidates feared that a temporary appointment at IIT Madras, far away from what the German engineers perceived as centers of scientific and technological development, would harm their careers and their future employability. Furthermore, only half as much equipment mentioned in the agreement had been delivered by 1963. After the expiry of the agreement in August, the collaboration limped along, hampering planning efforts and damaging the morale of the German faculty and staff in Madras.[33]

30 Ibid., 115.

31 Heinrich von Tiedemann, Der Staatsbesuch in Indien – Dokument einer Freundschaft und Partnerschaft (newsreel), Deutsche Wochenschau GMBH, 1962. Online: https://www.filmothek.bundesarchiv.de/video/590212?set<?_>lang=de, accessed December 2, 2020.

32 Annual Report 1963–1964. Indian Institute of Technology Madras (Madras 1964), 4.

33 Gerhard Fischer to Auswärtiges Amt, 9 November 1963 (PA AA, B 58/878).

The Foreign Office had appointed Robert Kraus as executive chief commissioner of the Federal Republic with the task of establishing 'the German IIT' in 1957. Kraus was professor and head of the Department of Mechanical Engineering at IIT Kharagpur from 1950 to 1957, after which he was appointed professor of gear mechanisms at the Braunschweig *Technische Hochschule*. At the initiative of the German government, Kraus served as advisor to the Indian government for two years from February 1962.[34] One of the problems was that despite being West Germany's chief commissioner, Kraus had no real authority on the ground at IIT Madras, where Professor Bibhutibhushan Sengupto was director. Kraus's mandate as advisor and chief commissioner ended in May 1964, at which point he also retired. The Indo-German agreement was finally extended to 30 September 1964.[35] Negotiations for a new agreement had started in 1961 but the process had run aground. In March 1963, Kraus had pushed towards extending the Indo-German agreement for at least another four years. Neither the Indian nor the German partners had kept to the schedule set by the agreement.[36]

From 1961 onward, the efforts by the Federal Republic of Germany to set up IIT Madras had been gradually taken over by the newly established Federal Ministry for Economic Cooperation and Development. The first batch of students graduated in the summer of 1964. The Foreign Office had planned that by this time the establishment of the institute would have been completed, West German assistance would be winding up, and the Germans would be handing over the facilities to their Indian colleagues and returning home. No such achievement was in sight. The relationship between German administrators in Bonn and the German faculty in Madras was not harmonious either. When the West German parliamentarian Erik Blumenfeld visited IIT Madras in December 1963, seven of the German faculty expressed their grievances in a memorandum.[37] Reducing Soviet influence was arguably the main motivation for the West German engagement in IIT Madras. This notwithstanding, the German faculty actually depended on textbooks published in the Soviet Union and the GDR.[38] In September 1964, West German Ambassador Georg

34 Embassy of the Federal Republic to Ministry of External Affairs, India, 6 November 1961 (PA AA, B 58/878); Heeger, Niedersächsisches Kultusministerium, to Robert Kraus, "Beurlaubung", 11 April 1962 (TU Braunschweig/Universitätsbibliothek/UABS_[B7:340]).

35 Herrmann to Auswärtiges Amt, "Verlängerung des Regierungsabkommens", 17 April 1964 (PA AA, B 58/878).

36 Robert Kraus to Norbert Berger, "Verlängerung des Regierungsabkommens", 5 March 1963 (PA AA, B 58/878).

37 Gerhard Fischer, "Denkschrift der deutschen Lehrkräfte", 8 April 1964 (PA AA, AV Neues Amt 3.666).

38 "Indien – TH Madras", 24 February 1965 (PA AA, B 58/878) and "Verwendung von Sowjetzonalen und Sowjetischen Lehrbüchern in englischer Sprache", 15 July 1965 (PA AA, B 58/879). This issue was not limited to textbooks in the English language; many of the German textbooks in the library of IIT Madras came from the GDR, because they were much cheaper and easier to procure in India than West German textbooks.

Ferdinand Duckwitz pointed out to Undersecretary Hans-Georg Sachs that the contest between the technical institutes established with West German, British, American, and Soviet help would not be decided in favor of the Federal Republic unless the West German government improved its support for personnel and increased its supply of equipment.[39]

1966–1971: Reorganization and planning for industrial research

When the project experienced crisis after the first agreement expired, West German diplomats and administrators realized that if the Indo-German collaboration at IIT Madras was to succeed in the competition with the Soviet, American and British IITs, they had to do something. The several extensions of the old agreement were finally followed by a new agreement signed on 7 June 1966.[40] The cooperation was reorganized and staff funding in support of experts increased from 20 to 40. Most importantly, the Federal Republic of Germany finally made a commitment to establish a *Technische Hochschule*-type technological research university rather than a *Technische Lehranstalt*-type polytechnic.

While the first agreement had focused on workshop education, the second agreement focused specifically on the establishment of research laboratories and the deployment of faculty and research assistants associated with these laboratories. In addition to covering the completion and extension of existing laboratories, the agreement specified new laboratories, including a machine-part and mechanical handling laboratory, new laboratories dedicated to physics and chemistry, a hydraulic laboratory, and a steel and reinforced concrete laboratory. The Madras Committee assumed the governance of the West German assistance. It consisted of members of the *Technische Hochschulen* at Aachen, Berlin, Braunschweig and Stuttgart, which became mentoring institutions for IIT Madras. The committee was headed by Gebhard Kerckhoff, a senior civil servant in the Federal Ministry of Economic Cooperation and Development.[41]

Hans A. Havemann became one of the main protagonists of the revamped collaboration with IIT Madras. Havemann had been appointed professor of international technological cooperation at the *Rheinisch-Westfälische Technische Hochschule* (RWTH) in Aachen in 1963. By then 51 years old, Havemann could already look back on an impressive international career. He had studied aeronautical engineering at the Technische Hochschule Braunschweig, where he specialized on aircraft engines. Having worked on the development of jet engines at the Aeronautical Research Institute in Braunschweig-Völkenrode during the war, Havemann was employed by the British Military Government

39 Hans-Georg Sachs to Rudolf Baetzgen, Ministry for Economy, 9 September 1964 (PA AA, B 58/878).

40 See Esderts, Technische Hochschule Madras, 212–223.

41 See "Kurzprotokoll über die konstituierende Sitzung des Madras-Ausschusses am 23.9. 1966 ...", Bundesarchiv Koblenz (henceforth BArch), B/213/2947.

in Germany immediately after the war. In 1946, he went as a German scientist to the National Gas Turbine Establishment in Pyestock, near Farnborough in England.[42]

In 1949, Havemann was appointed professor for internal combustion engines at the Indian Institute on Science (IISc) in Bangalore, where he stayed until 1957. When the West German Rucker mission came to India in 1956 to plan the establishment of 'the German IIT', Havemann met with the mission as member of the Indian delegation and tried to make clear to the emissaries that the Indian government expected 'the German IIT' to be a technological research university rather than an engineering school.[43] Havemann was also listed as a German expert with valuable India experience and a potential recruit for 'the German IIT'.[44] In the end, the Foreign Office decided to appoint Robert Kraus as executive chief commissioner of the German Federal Republic. Havemann went to New York instead to work with the engineering company M. W. Kellogg from 1957 to 1963, whereupon he received his professorship at RWTH Aachen.

In the spring of 1967, Havemann visited IIT Madras as well as other Indian engineering research and teaching institutions and government officials on behalf of the Federal Ministry for Economic Cooperation and Development, in order to evaluate the Indo-German collaboration. He was accompanied by the chancellor of RWTH Aachen, Friedrich Graf Stenbock-Fermor, and Martin Schmeißer, then founding director of the Technische Hochschule Dortmund and former director of RWTH Aachen, both members of the Madras Committee. Havemann revisited IIT Madras and New Delhi again in March 1968. Based on these visits, Havemann drafted detailed reports about the history and current situation at IIT Madras, mentioning all its departments, units and the different actors, and making recommendations for its further development. In addition, observations were included with opinions from the other IITs and other technological research institutions.[45]

His report did not single out any particular discipline or laboratory for development but rather addressed structural aspects. Havemann criticized the

42 Hans A. Havemann, "Beruflicher Lebenslauf", 1963 (Hochschularchiv RWTH Aachen, N0105). See also Andrew Nahun, "'I believe the Americans have not yet taken them all!': The Exploitation of German Aeronautical Science in Postwar Britain", in Tackling Transportation, ed. H. Trischler and S. Zeilinger (London 2003), 99–138, for a history of German scientists at Farnborough.

43 Ernst W. Meyer, "Betr: Kommission für die Errichtung einer Technischen Lehranstalt", 29 October 1956 (PA AA, B 58/35).

44 Rucker, "Deutsche beratende Kommission für die Errichtung ...", 20 December 1956, p. 5 (PA AA, B 58/35).

45 Hans A. Havemann, Besuchsbericht: Indian Institute of Technology – Madras 1967, Vol. 1: Inhaltsübersicht und Zusammenfassung; Vol. 2: Ausarbeitung (Aachen 1968), and Havemann, Besuchsbericht: Indian Institute of Technology 1968, Gesichtspunkte für die Entwicklung des Instituts (Aachen 1968).

fact that there was no overarching plan or vision for IIT Madras, especially with respect to the institution's intended or likely contribution to the industrial development of India. According to Havemann, its location and planning had not been decided on the grounds of climatic conditions, availability of infrastructure, or relations with local industry. The first director, Sengupto, had supported the model of workshop-based practical engineering training at IIT Madras, in line with the previous policy of the West German government. Now the Indian government wanted to direct it towards industrial research.[46] On account of their practice-oriented training, IIT Madras graduates had no problem finding employment in Indian industry. The PhD candidates, on the other hand, were generally being rejected. However, the low salary level prompted 50 to 60% of IIT Madras graduates to go abroad and later return as international experts on higher salaries. This meant a brain drain but also opened up opportunities for returning engineers to bring back their international contacts and expertise to India.[47]

Havemann rated the strong focus on workshop practice in engineering education as a success but wondered whether this could be maintained, hinting at changes in engineering curricula in Germany. This was echoed by G. K. Chandiramani, joint educational advisor to the Indian government, who found that IIT Madras already provided good practical education but now had to strengthen its masters and doctorate programs and its ties with industry. All in all, Havemann argued for more academic freedom for the faculty, who were conducting too much undergraduate teaching and too little research, and argued against the inflexible engineering curriculum, which left students little scope to determine their own directions of study.[48]

Both the National Aeronautical Laboratories in Bangalore and the Tata Institute of Fundamental Research (TIFR) in Bombay showed, according to Havemann, that it was possible to establish first-class research institutions in India that developed their own initiative and visions. The director of the National Aeronautical Laboratories, Sitaram Rao Valluri, had previously been head of the aeronautics department at IIT Madras, and like Havemann, criticized IIT Madras as being too exam-oriented. According to Valluri, there was no master plan for technical education in India, which suffered from overly centralized bureaucracy at the level of central government. Valluri anticipated that IISc Professor Arcot Ramachandran would become the new IIT Madras director. Havemann saw both Valluri and Ramachandran as representatives of a new generation of Indian science administrators who had received their training in the USA, whence they also drew their ambitions for industrial research.[49]

46 Besuchsbericht Vol. 1, 16; Vol. 2, 99–100 and 132.
47 Ibid., 100 and 162.
48 Ibid., 145 and 203a.
49 Ibid., 196–199.

The German faculty continuously insisted on acquiring more German scientific assistants. This, Havemann explained, would be counterproductive since the mission was not to operate German research laboratories in India but to train Indian scientists and technicians to take over these laboratories within a few years. Both socially and academically, the Germans formed a rather close-knit group, and though it was good that the German researchers identified with the laboratories they had set up, that should not lead to any delay in the hand over. Havemann perceived the role of the German group not as determining but influencing academic processes towards creating Indian counterparts, introducing them to German methods, and supporting their professional advancement. By 1971, 70% of the laboratories were to be transferred into Indian hands.[50] Havemann recommended training for German staff in pedagogy and psychology, specifically with respect to what he identified as the Indian mentality. Tactfulness, patience, and sensitivity were probably more important to the success of the project than technical and scientific expertise.[51]

Havemann also criticized the German administration of the collaboration. The administrative division of the Indo-German collaboration between the Corporation for Technical Assistance to Developing Countries (*GAWI*), the Ministry of Economic Cooperation and Development, and the Ministry for Economic Affairs produced undefined responsibilities.[52] The employment relations between the German staff and the *GAWI* were not clear either. Indian expectations that senior German professors would be delegated to IIT Madras could not be met since the posting was not attractive on account of the perceived academic isolation and lack of research opportunities. The German government especially needed to create more opportunities for younger German researchers to continue their careers in Germany following their stays in Madras.[53] The planning for laboratory equipment at IIT Madras in Germany was unrealistic and happened without adequate involvement by the German faculty in Madras, who required more autonomy. The German consulate in Madras and the German embassy in Delhi should have played a stronger role in the project but lacked techno-scientific expertise.[54]

Havemann emphasized the need to plan and fund the transition from material aid to a *real* academic partnership once the facilities had been conveyed into Indian hands. The considerable financial investment of the West German government in establishing IIT Madras could only be justified if it led to Indo-German scientific exchanges over the long term, which were oriented towards India's industrial requirements. How could such a long-term

50 Ibid., 94 and 96–97; Besuchsbericht, Gesichtspunkte, 13.
51 Besuchsbericht Vol. 1, 17.
52 Besuchsbericht Vol. 2, 163.
53 Besuchsbericht Vol. 1, 18 and 21.
54 Ibid., 22–23; Besuchsbericht Vol. 2, 94, 102, and 153.

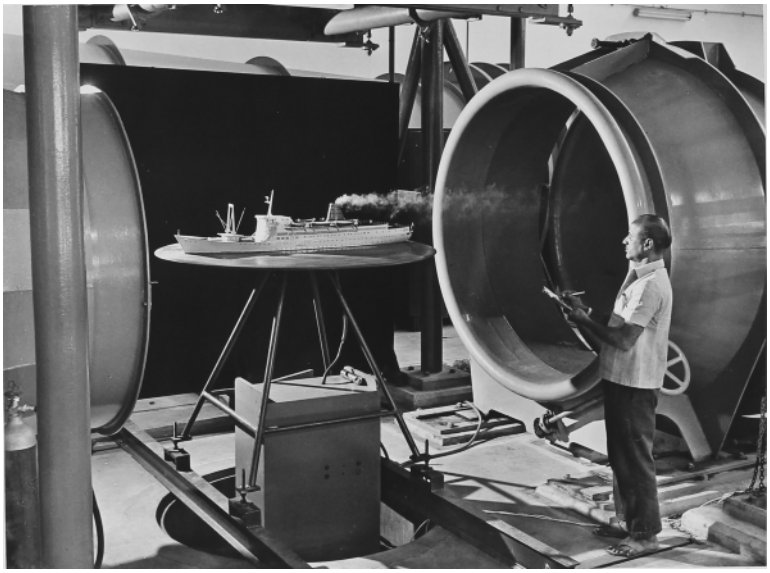

Fig. 2: A model of the SS State of Bombay, built by M/S Mazagon Dock Ltd., in the 1.5-m-diameter test section of the closed-circuit, low-speed wind tunnel at the Department of Applied Mechanics, IIT Madras. This wind tunnel was capable of a maximum speed of 60 m/s and was provided with a semi-automatic six-component balance. Photographed by Cadambi Gourishankar (Photo: Heritage Centre, IIT Madras).

academic partnership with Germany be sustained? Havemann argued that the material scientific assistance had to be correlated with human scientific assistance, which could only be achieved through academic exchanges among guest professors, guest researchers, PhD students, and technicians. After the laboratories had been taken over by the Indian partners, Havemann asserted, collaboration and partnerships with German laboratories should be established and maintained.[55]

Translating policy into research practice

Havemann's report is emblematic of the Federal Republic's policy shift towards assistance at IIT Madras. With the second agreement of 1966, the political guidelines for the collaboration had changed on the West German side from workshop-centered engineering training to industry-oriented research. What did these guidelines mean for the German faculty on the ground? To orchestrate industry-oriented research, a total of 30 laboratories were established across the various departments at IIT Madras and equipped with state-of-the-art instruments, including large installations, such as a wind tunnel (see Fig. 2) and a towing tank. The list of laboratories that were supported by the Indo-German agreement included vibration research, materials testing, fluid

55 Ibid., 88 and 135–136; Besuchsbericht Vol. 1, 18; Besuchsbericht, Gesichtspunkte, 18.

Fig. 3: The IIT Madras Computer Center with the IBM 370 mainframe computer after the opening in 1973. Photographed by Cadambi Gourishankar (Photo: Heritage Centre, IIT Madras).

mechanics, plastics engineering, thermal process engineering, regulating and control technology, construction materials, soil mechanics, high frequency, communication, solid state technology, electric machines, electrical measurement, high voltage technology, precision mechanics and optics, steam engines and heat conductivity, combustion engines, machine tools, precision measurement, thermodynamics, and welding technology. Central laboratories provided equipment for mass spectrometry and Raman, X-ray, and laser spectroscopy. Most instruments came from West Germany but the example of the Computer Center, where an IBM 370 was chosen in 1973 (see Fig. 3), in favor of a German AEG-Telefunken computer, shows that the promotion of German technology was not an overriding concern. In 1978, Rainer Jerosch of the German Society for Technical Cooperation (*GTZ*) stated that IIT Madras had received more scientific equipment from its international partner than any of the other IITs.[56] Together with the instruments, German researchers at mid-level faculty positions were appointed to set up and supervise these labs, and to train Indian students and staff.

One of these 30 laboratories was the Laboratory of Metallurgy, which received a Siemens electron microscope in 1968 (see Fig. 4). Edith Butenuth was appointed as associate professor in physical metallurgy at that laboratory in October 1968 and stayed until 1971. She gave lectures and taught laboratory courses, but her main assignment was to set up the electron microscopy

56 See Esderts, Technische Hochschule Madras, 183–184.

Fig. 4: Unknown researcher operating the Siemens Elmiskop electron microscope that Edith Butenuth had set up. Photographed in the Laboratory of Metallurgy at IIT Madras after 1971 (Photo: Heritage Centre, IIT Madras).

laboratory and subsequently hand it over to her Indian colleagues. As far as we can tell from available sources, Butenuth was the only German female faculty member recruited to IIT Madras. Other German women on campus were either typists or wives of German faculty and staff. The *GAWI*, which contracted the German faculty and staff, in fact preferred to send married couples since family households were seen to be beneficial to the mental health of men working far away from home. Edith Butenuth also came with her husband and their three daughters; Gottfried Butenuth, did not join her as househusband though, but as professor of chemistry at IIT Madras.

Edith Butenuth was 51 years old when she came to IIT Madras in 1968. She had started her career in electron microscopy as a laboratory technician, studied physics alongside her work, and finished her dissertation at RWTH Aachen in 1965.[57] During her time at IIT Madras, she was on leave from her position at the electron microscopy laboratory of the Department of Ferrous Metallurgy at RWTH Aachen. Siemens had a branch office in Madras and had already installed an electron microscope at the Central Leather Research Institute neighboring IIT Madras, which prompted Butenuth to believe that the instrument could be installed swiftly.[58] Instead, the electron microscope remained in its crates from April 1968 to early 1971, as she reported in an

57 Edith Butenuth, "Lebenslauf", 25 August 1968 (PA AA, AV Neues Amt 3.460), and Friedrich Lenz, "In Memoriam Edith Butenuth", Elektronenmikroskopie 13 (1996), 31.

58 Edith Butenuth, "– Liste RF – Spez. – Metallurgie Elektronenmikroskop", 15 March 1969 (BArch B/213/2941).

article about her experience with the instrument in the German *Physikalische Berichte*.[59]

Butenuth's article constitutes an elaborate critique of how the administrators of the *GAWI* had handled the transfer and setup of the electron microscope. The installation was hampered by the hot and humid climate, lack of cooling water, fluctuations in the electricity supply, and vibrations far above the permissible limits. Climatic conditions and the boundaries of the local infrastructure, however, were only part of what Butenuth and her colleagues had to deal with. The physical operation conditions were mingled with conflicts about control and competence on both the German and Indian sides. Who had the authority over the project, and thereby over the laboratories and the instruments installed in them? Butenuth criticized the absence of planning and the fact that she was not included in any decision-making process. Her status as associate professor was not senior enough for her to enforce her authority over the project, which was challenged by her Indian colleagues.

The kinds of issues that Butenuth discussed were common to most of the laboratories set up under the Indo-German collaboration. The German experts in Madras had implemented what had been politically defined *a priori* as a successful project of techno-scientific collaboration. The German faculty had their own measure of success, which was not defined by science diplomacy but rather by the operation of the laboratories on the ground. German faculty members needed to produce scientific output in terms of research papers to further their own careers, especially since they already felt academically isolated and many of them faced an uncertain career situation once their appointment at IIT Madras had ended.[60]

Limits of academic autonomy for the German faculty

While German faculty were appointed as professors at IIT Madras, they did not in fact enjoy the same academic freedom that a professor enjoyed at a German university. West German government administrators repeatedly stressed that they did not respect the German professors at IIT Madras as *real* German university professors.[61] Their limited autonomy was enshrined in the contracts of the *GAWI* with the German faculty, which defined the latter first and foremost as science diplomats: The two reasons given for why German faculty could be laid off after probation were either that their behavior had damaged the interests or the reputation of the Federal Republic of Germany,

59 Edith Butenuth, "Ein Elektronenmikroskop für die Entwicklungshilfe", Physikalische Blätter 29, No. 11 (1973), 508–513.

60 Havemann, Besuchsbericht Vol. 1, 18.

61 German Embassy counselor Hildegund Feilner, for example, wanted to send a "real professor" to "the rather difficult professors in Madras (who in reality all are not even assistant professors) ....", see "Auszug aus einem Schreiben von VLR I Dr. Feilner, New Delhi, vom 13, Juli d.J. [1965]" (PA AA, B 58/878).

or that political reasons would not allow further employment of the respective faculty member in the guest country.[62] German staff were specifically requested to get all their publications approved by the *GAWI*, and the West German consulate in Madras kept a watchful eye on them.

What this could mean in practice is illustrated by Hermann Heitmann's personal experience. Heitmann was appointed as assistant professor in the Metrology Laboratory of the Department of Mechanical Engineering in November 1967, after having completed his doctoral dissertation at RWTH Aachen the previous year.[63] In March 1970, Heitmann sent out a four-page questionnaire to about 300 Indian staff members, asking them for their impressions of the German staff. Heitmann specifically did not ask about any individual German staff member but about the Indian impression of 'The Germans' in general. Many of the questions concerned rather delicate aspects in a very direct way regarding the relationship between Indian and German staff. The Indian staff were asked about their views on the academic qualifications of the Germans, about their behavior towards Indians at work, whether they were displeased with Germans at any occasion, whether there existed mutual cooperation at IIT Madras, whether German staff knew about Indian life or Indian art, and so forth.[64]

IIT Madras Director Arcot Ramachandran informed German Consul Klaus Schrameyer about the survey after having summoned Heitmann; and both Ramachandran and the German consulate agreed that Heitmann's survey had to be stopped.[65] Heitmann withdrew his questionnaire, reassuring them that the survey had been at his own initiative, based on his personal interest in the relationship between Indian and German staff after ten years of Indo-German collaboration, and that nobody else was involved, especially not Hans Havemann. The survey apparently created much concern among both Indian and German staff members. According to the documents, some even suggested that the survey was meant to create unrest between the two communities. Gebhard Kerckhoff was particularly concerned and wanted to know whether Heitmann's survey constituted a breach of contract. Ultimately, no action was taken against Heitmann but the consulate instructed him that such a survey was "politically inopportune", and surveys anyway had to be presented to the *GAWI* for prior approval, just like publications.[66]

62 See, for example, "Dienstvertrag zwischen GAWI und Hermann Heitmann", 1 October 1967 (PA AA, AV Neues Amt 3.460).

63 Hermann Heitmann, "Lebenslauf", 1967 [not dated] (PA AA, AV Neues Amt 3.460).

64 Questionnaire by Hans Heitmann, 21 March 1970 (PA AA, AV Neues Amt 3.460).

65 Arcot Ramachandran to Klaus Schrameyer, 31 March 1970, and Reinhart Bindseil, German Consulate, "Vermerk Betr. Professor Dr. Ing. H. Heitmann ...", 3 April 1970 (both PA AA, AV Neues Amt 3.460).

66 Kerckhoff, "Betr: Umfrage unter Angehörigen des IIT Madras", 13 April 1970, and Schrameyer, "Betr: Dr. Heitmanns Fragebogenaktion ...", 5 May 1970 (both PA AA, AV Neues Amt 3.460).

German policy and governance of the Indo-German collaboration at IIT Madras was not necessarily aligned with the interests and opinions of German faculty on the ground. Edith Butenuth was not alone with her experience of receiving little if any support from the German institutions that had sent her, particularly while she was trying to establish her authority over the laboratory that she was setting up. The German faculty in Madras were not treated as independent academics but as the means towards getting the collaboration started. If they developed an agenda that came into conflict with the agenda of the German administrators, German faculty were seen as troublemakers. Hans-Dieter Henkel, senior scientific assistant at the Physics Department, for example, wrote to the Federal Office for Industrial Economics in 1969 regarding the planned semiconductor and solid-state laboratory, and accused the Office of having done "whatever necessary" to weaken his own position and that of his senior colleague, Professor Werner Koch, by planning the details of the laboratory with Professor Chilukuri Ramasastry, head of the physics department, without informing Koch and Henkel. Henkel claimed that at least "one German man" was necessary to stop Ramasastry from establishing a "one-man operation" in the department. According to Henkel, it was the German faculty who guaranteed that young Indian scientists could participate in scientific research. Especially in this case, Henkel insisted, the German authorities should follow the principle of "no German mark without a man" and not deviate from it. German staff should only be withdrawn once the majority of the capable younger Indian staff had been empowered to share responsibilities at the department.[67]

Members of the Madras Committee saw things differently. Appointments of heads of departments were decided exclusively by the Indian administration. To the Madras Committee, Ramasastry appeared to be an experienced and well-respected scientific authority who could probably be trusted to continue the activities in experimental physics once the German staff had left.[68] The Madras Committee did not consider it their business to assess the character of Indian faculty. The reluctance of Henkel and other German faculty to hand over the laboratories to their Indian counterparts echoes Werner Dolph's critique of German development aid in his article *Die ungeliebten Experten* (The Unloved Experts) in the German weekly *Die Zeit* in 1973. The objective of successful development aid should be—according to Dolph—training local experts to take over as fast as possible, to make the foreign experts dispensable. However, many development experts worked towards the opposite—making themselves indispensable.[69] Conflicts, rivalries, and social exclusion existed

67 Henkel to Kretzschmar, Bundesamt für gewerbliche Wirtschaft, 9 April 1969 (BArch B/213/2932), and Henkel to GAWI, 9 September 1969 (BArch B/213/2935).

68 "Labor Experimentalphysik (RC)", undated [1968], and Rudolf Quack, Technische Hochschule Stuttgart, to Henkel, 14 May 1969 (both BArch B/213/2932).

69 Werner Dolph, "Die ungeliebten Experten", Die Zeit 25 (1973).

within the German group at IIT Madras as well, and at the same time there was mutual respect and appreciation between Indian and German staff. However, there was also a sense of alienation which was never quite overcome or resolved. As a result, projects like Hermann Heitmann's questionnaire about 'The Germans' was rendered politically disruptive.[70]

Conclusion

In 1974, eleven years after the first Indo-German agreement had expired, German faculty and technicians finally handed over the laboratories and workshops to their Indian counterparts although the Madras Committee continued until 1977. Following Havemann's recommendations in his reports, new agreements were signed; and while we can argue that there was still no symmetry of power between the two partners, the Indo-German collaboration was gradually transformed from mentorship to cooperation. Hans Havemann had suggested that the success of the German involvement in setting up IIT Madras had to be measured against whether or not IIT Madras could establish itself as a prime institution for industrial research, and whether the cooperation could be maintained as a long-term means of Indo-German scientific exchange. This was a major policy shift from the first agreement, which did not envisage continuing collaboration.

What were the reasons for this policy shift? West German changes in foreign policy from the late 1950s to the late 1960s and early 1970s made room for conceiving a more refined development policy. The Hallstein doctrine, which had been the main motivation behind the German offer to assist the establishment of IIT Madras, was abandoned in 1970.[71] Havemann, who had been appointed director of the newly established Institute of International Technological and Economic Collaboration at RWTH Aachen in 1963, had a much broader and more long-term vision of international techno-scientific collaboration than simply setting up an institution and leaving.[72] The RWTH Aachen itself maintained a rather large network of international collaborations in the 1960, including with technical universities in Chile, Columbia, and Japan.[73]

70 See also Preuss, "Ohne Toleranz funktioniert nichts", 92–99, about the social relationships within the German group as well as between Germans and Indians.

71 See Das Gupta, Handel, Hilfe, Hallstein-Doktrin; Corinna Unger, Entwicklungspfade in Indien. Eine internationale Geschichte, 1947–1980 (Göttingen 2015); Unger, "Industrialization vs. Agrarian Reform" for a History of West German Development Politics in India.

72 See Martin Schmeißer, Friedrich Graf Stenbock-Fermor and Hans A. Havemann, "Unsere akademische Partnerschaft mit der südindischen Technischen Hochschule Madras", Alma Mater Aquensis V (1967), 77–85. See also Hans A. Havemann, "Neue Aspekte der Entwicklungsländerforschung", Arbeitsgemeinschaft für Forschung des Landes Nordrhein-Westfalen Heft 221 (1970), 33–54.

73 J. Terbrüggen, "Partnerschaftsverhältnisse mit ausländischen Universitäten", Alma Mater Aquensis VI (1968), 58–60.

Looking at the level of industrial research carried out at IIT Madras in recent decades, and the large number of Indo-German collaborations and exchanges, Havemann's strategy appears to have succeeded. The Indo-German Center for Sustainability, inaugurated in 2010, and the Strategic Partnership between RWTH Aachen and IIT Madras are probably the most prominent current examples. While German teaching methods have certainly not gained the upper hand, IIT Madras is the one among the original IITs that has managed to maintain a strong tradition of techno-scientific collaboration with the country and the institutions that had assisted in its establishment. What has been lost, however, is the high quality and intensity of practical workshop education, which granted space for a more theory-oriented curriculum, whereas the heavy focus on exams persists. The socially transformative nature of the IITs remains a standing question. Instead of becoming an engine of social transformation, anthropologist Ajantha Subramanian argues, IIT Madras continues to be an engine of social and specifically caste reproduction.[74]

Setting up IIT Madras has been the largest and most advanced technical education project undertaken by the Federal Republic of Germany outside of Germany, but only one of the many German projects on technical education in India, many of which were aimed at vocational training.[75] While assistance in technical education has been a crucial component of development aid, it has thus far not attracted much—if any—attention among historians of technology. The transnational biographies of such scientists and engineers as Robert Krauss and Hans Havemann, who taught and worked in Britain, China, Germany, India, and the United States, and the global ambitions of institutions such as the Institute of International Technological and Economic Collaboration, building partnerships from Tokyo to Tennessee, and from Madras to Valparaiso, have left little if any traces in history writing. Such entangled histories would be crucial towards facilitating a more global understanding of the dynamics of 20th century science and technology beyond the India-Germany binary.[76]

Address of the author: Roland Wittje, Associate Professor, Department of Humanities and Social Sciences, Indian Institute of Technology Madras, 600 036 Chennai, India, e-mail: roland@iitm.ac.in

74 Subramanian, The Caste of Merit.

75 Preuss, "Ohne Toleranz funktioniert nichts".

76 Roland Wittje "Indo-German Entanglements in Science and Technology. The Indian Institute of Technology Madras". MIDA – Archival Reflexicon (Berlin 2019).

Hinweise für Autor/innen

Die Zeitschrift TECHNIKGESCHICHTE publiziert nur Erstveröffentlichungen. Beiträge werden in elektronischer Form (vorzugsweise als Word-Dokument) an die Anschrift der Schriftleitung (siehe Impressum) erbeten. Beigefügte Bilder oder Unterlagen müssen einen Herkunfts- und Erlaubnisvermerk für die Wiedergabe haben. Für die Manuskriptgestaltung beachten Sie bitte die Autor/innenhinweise auf der Homepage der Zeitschrift: www.tg.nomos.de. Die Verfasser/innen von Beiträgen erhalten drei Hefte der Zeitschrift; die Verfasser/innen von Besprechungen erhalten eine PDF-Datei ihrer Rezension. Redaktion und Verlag haften nicht für unverlangt eingereichte Manuskripte, Daten und Illustrationen.